

REMARKS

The Applicants have carefully reviewed the Office Action mailed October 16, 2006 and offer the following remarks.

The Office Action objected to Figures 1-4, 8A, 8B, and 9 alleging that these figures should be designated by a legend such as "Prior Art." In particular, the Office Action indicated that Figures 1-4, 8A, 8B, and 9 are shown in U.S. Patent Application No. 2004/0066866 to *Tong et al.* (hereinafter "*Tong*"). The Applicants traverse the objection.

The Office Action indicated that Figures 1-4 of the present application are the same as Figures 1-4 in *Tong*. The Applicants respectfully disagree. Figure 4 includes subject matter not shown in Figure 4 of *Tong*. Importantly, Figure 4 further defines that which is shown in Figures 1-3. Thus, Figures 1-4 do not and should not include the label "Prior Art." In particular, Figure 4 includes mapping logic 52 which systematically maps data bits into symbols depending on a chosen baseband modulation. The Applicants submit that this feature is not shown in Figure 4 of *Tong*. Additionally, Figure 4 of the present application discusses the logical transmission architecture of a base station 14 described in Figures 1 and 2. Thus, Figure 4 further defines that which is shown in Figures 1 and 2. Furthermore, as indicated in the Specification, the logical transmission architecture may be implemented for both uplink and downlink transmissions.¹ Thus, the logical transmission structure may also be used with a mobile terminal 16, also described in Figure 1 and in Figure 3. For this additional reason, Figure 4 further defines that which is shown in Figure 1 and also further defines what is shown in Figure 3. Accordingly, as Figure 4 in the present application is not the same as Figure 4 in *Tong*, Figure 4 does not require the label "Prior Art." Additionally, as Figure 4 further differentiates what is shown in Figures 1-3 of the present application, the Applicants respectfully submit that Figures 1-3 of the present application are different from Figures 1-3 of *Tong*. Therefore, Figures 1-3 of the present application do not require the label "Prior Art."

According to the Office Action, Figures 8A and 8B are the same as Figures 6A and 6B of *Tong* and should include the label "Prior Art."² The Applicants respectfully disagree. Figures 8A and 8B further describe what is shown in Figure 7, which includes subject matter not disclosed in *Tong*. Figures 8A and 8B illustrate constellations from the perspective of two

¹ See Specification, paragraph [0034].

² See Office Action mailed October 16, 2006, p. 2.

transmit antennas. In particular, Figures 8A and 8B illustrate how the present invention, as shown in Figure 7, reduces the required maximum likelihood decoding from an original constellation of 16 points to one of four points. The Applicants submit that as Figures 8A and 8B of the present application illustrate a concept which is not described in *Tong*. Figures 8A and 8B are different from Figures 6A and 6B in *Tong* and do not require the label "Prior Art."

The Office Action also indicated that Figure 9A of the present application is the same as Figure 7 of *Tong* and thus requires the label "Prior Art."³ The Applicants respectfully disagree. Figure 7 of *Tong* is not the same as Figure 9 of the present application. More specifically, Figure 9 of the present application includes a block 200 having the designation "Estimate Channel Response Matrix (H)." In addition, Figure 9 includes a block 202 having the designation "Compute Inverse of MIMO Channel Response Matrix ($H^H H$)⁻¹." The Applicants submit that neither of these blocks are shown in Figure 7 nor any other Figures of *Tong*. Accordingly, for at least this reason, Figure 9 of the present application is different from Figure 7 of *Tong* and does not require the label "Prior Art." For this reason and the reasons noted above, the Applicants respectfully request that the drawing objections be withdrawn.

Claims 1-36 were rejected under 35 U.S.C. § 101 because, according to the Office Action mailed October 16, 2006, the claimed invention is allegedly directed to non-statutory subject matter. In maintaining the rejection, the Office Action mailed October 16, 2006 indicates that claims 1-36 "do not contain a tangible result."⁴ The Applicants respectfully disagree. According to Chapter 2106 of the M.P.E.P., the "tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing." Chapter 2106 goes on to state that a patent may be granted for an "invention of some practical method or means of producing a beneficial result or effect." The Applicants respectfully submit that the invention recited in claims 1-36 produces a beneficial result. More specifically, claim 1 recites a method comprising, among other features, selecting a competing smallest distance from the second Euclidean distances "as a soft demapping value." A soft demapping value corresponds to a received symbol, which represents transmitted data. Claims 16 and 31 include similar features. As such, a soft demapping value is a beneficial result and thus a tangible result. Thus, the claims produce a tangible result. Claims

³ See Office Action mailed October 16, 2006, p. 2.

⁴ See Office Action mailed October 16, 2006, p. 2.

1-36 are directed toward statutory subject matter and the Applicants respectfully request that the rejection be withdrawn.

Claims 1-4, 7-13, 16-19, 22-28, and 31-35 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,968,198 to *Hassan et al.* (hereinafter "*Hassan*"). The Applicants respectfully traverse the rejection.

According to Chapter 2131 of the M.P.E.P., in order to anticipate a claim under 35 U.S.C. §102, "the reference must teach every element of the claim." The Applicants respectfully submit that *Hassan* does not disclose each and every element recited in claims 1-4, 7-13, 16-19, 22-28, and 31-35. Accordingly, *Hassan* cannot anticipate these claims.

Claim 1 recites a method comprising, among other features, "selecting second Euclidean distances corresponding to a competing bit from the first Euclidean distances" for each bit in a bit vector. Claims 16 and 31 include similar features. The Applicants respectfully submit that *Hassan* does not disclose the feature of creating a second set of Euclidean distances from a first set of Euclidean distances. At most, *Hassan* discloses calculating a Euclidean distance between a received vector "r" and a codeword having a logical zero in an information bit location along with calculating a Euclidean distance between the received vector "r" and the codeword having a logical one in an information bit location.⁵ Thus, *Hassan* only discloses creating a first set of Euclidean distances. *Hassan* does not disclose creating a second set of Euclidean distances from the first set of Euclidean distances.

Claim 1 also recites "selecting a competing smallest distance from the second Euclidean distances as a soft demapping value" for each bit in a bit vector. Claims 16 and 31 include similar features. The Applicants respectfully submit that *Hassan* does not disclose the feature of selecting a distance from a second set of Euclidean distances for a number of reasons. First, as detailed above, *Hassan* does not disclose creating a second set of Euclidean distances from a first set of Euclidean distances. Thus, it follows that *Hassan* cannot disclose selecting anything from a second set of Euclidean distances where the second set of Euclidean distances were formed from a first set of Euclidean distances. Second, even assuming *arguendo* that somehow *Hassan* did disclose creating a second set of Euclidean distances, a point which the Applicants do not concede, *Hassan* still does not disclose selecting a competing smallest distance from a second set of Euclidean distances. Third, even assuming *arguendo* that *Hassan* somehow did disclose

⁵ See *Hassan*, col. 11, ll. 5-11.

selecting a competing smallest distance from a second set of Euclidean distances, a point which the Applicants do not concede, *Hassan* still does not disclose selecting a competing smallest distance as a soft demapping value.

In maintaining the rejection, the Office Action indicates that the “reliability information comprising the soft information output is calculated for each individual symbol (bit) within the hard information output.”⁶ While *Hassan* does disclose calculating reliability information comprising soft information output for individual bits, the Applicants submit that the soft information does not correspond to a competing smallest distance from a second Euclidean distance.⁷

Furthermore, the Applicants respectfully submit that the disclosure of *Hassan* is not applicable to the present invention. In particular, *Hassan* relates to a forward error correction decoder which deals with error correction problems. On the other hand, the present invention relates to interference corrections which are separate from forward error correction problems. More specifically, forward error correction occurs either before or after interference corrections. Therefore, for this reason and the reasons noted above, *Hassan* does not disclose all the features recited in claims 1, 16, and 31 and the Applicants respectfully request that the rejection be withdrawn. Likewise, claims 2-4, 7-13, 17-19, 22-28 and 32-35, which depend from claims 1, 16, and 31 respectively, are patentable for at least the same reasons and the novel features recited therein.

Claims 5, 6, 20, 21, and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hassan* in view of “Turbo-coded Modulation for Systems with Transmit and Receive Antenna Diversity Over Block Fading Channels: System Model, Decoding Approaches, and Practical Considerations” by *Stefanov et al.*, IEEE Journal on Selected Areas in Communications, IEEE INC. New York, vol. 19, no. 5, May 2001 (pages 958-968) (hereinafter “*Stefanov*”). The Applicants respectfully traverse the rejection.

According to Chapter 2143.03 of the M.P.E.P., in order to “establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.” The Applicants respectfully submit that neither *Hassan* nor *Stefanov*, either singularly or in combination, disclose or suggest all the features recited in claims 5, 6, 20, 21, and 36. As

⁶ See Office Action mailed October 16, 2006, p. 3.

⁷ See *Hassan*, col. 2, ll. 1-3.

mentioned above, *Hassan* does not disclose all the features recited in claims 1, 16, and 31, the base claims from which claims 5, 6, 20, 21, and 36 variously depend. In addition, *Stefanov* does not overcome the deficiencies of *Hassan*. Therefore, claims 5, 6, 20, 21, and 36 are patentable over the cited references and the Applicants respectfully request that the rejection be withdrawn.

Claims 14, 15, 29, and 30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hassan* in view of U.S. Patent No. 6,693,982 B1 to *Naguib et al.* (hereinafter "*Naguib*"). The Applicants respectfully traverse the rejection. As set forth above, *Hassan* does not disclose all the features recited in claims 1 and 16, the base claims from which claims 14, 15, 29, and 30, respectively depend. Moreover, *Naguib* does not address the deficiencies of *Hassan*. Accordingly, claims 14, 15, 29, and 30 are patentable over the cited references and the Applicants respectfully request that the rejection be withdrawn.

The present application is now in condition for allowance and such action is respectfully requested. The Examiner is encouraged to contact Applicants' representative regarding any remaining issues in an effort to expedite allowance and issuance of the present application.

Respectfully submitted,

WITHROW & TERRANOVA, P.L.L.C.

By: 

Benjamin S. Withrow
Registration No. 40,876
P.O. Box 1287
Cary, NC 27512
Telephone: (919) 654-4520

Date: January 16, 2007
Attorney Docket: 7000-267